

NEW DESCRIPTIONS

STUDIES ON SOME APHELINID (HYM.: CHALCIDOIDEA) PARASITES OF HEMIPTEROUS INSECTS OF INDIA¹

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(With twenty-five text-figures)

Three new Aphelinid species viz., *Eretmocerus hydrabadensis*; *Azotus aleuroides* and *Physcus oriensis* have been described. *Prospaltella clypealis* Silvestri has been redescrbed in greater detail. Keys to Indian species of *Eretmocerus* and *Physcus* have also been proposed.

Eretmocerus Haldeman

Haldeman, 1850. Amer. Jour. Sci. Arts.
9 (2): 111.

Type species: *Eretmocerus corni* Haldeman.

The genus can be easily separated from allied genera of the family by the:

Five segmented antennae with two annular funicle segments and a long unsegmental club; four segmented tarsi. Characters suggested by Hayat (1972) apply well to the species, namely, "pronotum consisting of two triangular lobes joined in the middle by a membrane; subgenital plate broad, posterior margin with a notch in the middle; outer plates of ovipositor with submarginal ridge along dorsal margin".

Fletcher (1914) reported for the first time an undescribed species bred from castor whitefly. Mani (1941) described a new species based on male. Samuel (1950) reported *E. masii*

Silv. Hayat (1972) added three new species, namely, *E. indicus* Hayat, *E. mashhoodi* Hayat and *E. gunturiensis* Hayat.

KEY TO INDIAN SPECIES OF THE GENUS *Eretmocerus* HALDEMAN BASED ON FEMALES³

1. Pedicel three or more than three times longer than wide2
- Pedicel less than three times longer than wide5
2. Marginal vein longer than stigmal.....3
- Marginal vein as long as stigmal.....
.....*E. haldemani* Howard
3. Speculum bounded by two or more than two rows of setae.....4
- Speculum bordered by a single row of setae; submarginal with two setae; marginal fringe 1/6 of wing disc*E. indicus* Hayat
4. Speculum bordered by two rows of setae; first funicle segment triangular; scutellum with 4 setae; thorax and gaster yellow.....
.....*E. mashhoodi* Hayat
- Speculum bordered by two complete and third incomplete row of setae; first funicle ring like; scutellum with 6 setae; thorax light brown, gaster dark.....*E. hydrabadensis* sp. nov.
5. Club spatulate; first funicle triangular or quadrate6
- Club cylindrical; first funicle ring like, much shorter than second; club nine times as long

¹ Accepted June 1981.

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³ *E. masii* Silvestri and *E. delhiensis* Mani are not included in the key as they are recorded from males.

- as wide; speculum bordered by 11 setae.....
*E. gunturiensis* Hayat
 6. First funicle triangular, second wider than
 long.....*E. corni* Haldeman
 — First funicle quadrate; second longer than wide
*E. mundus* Mercet

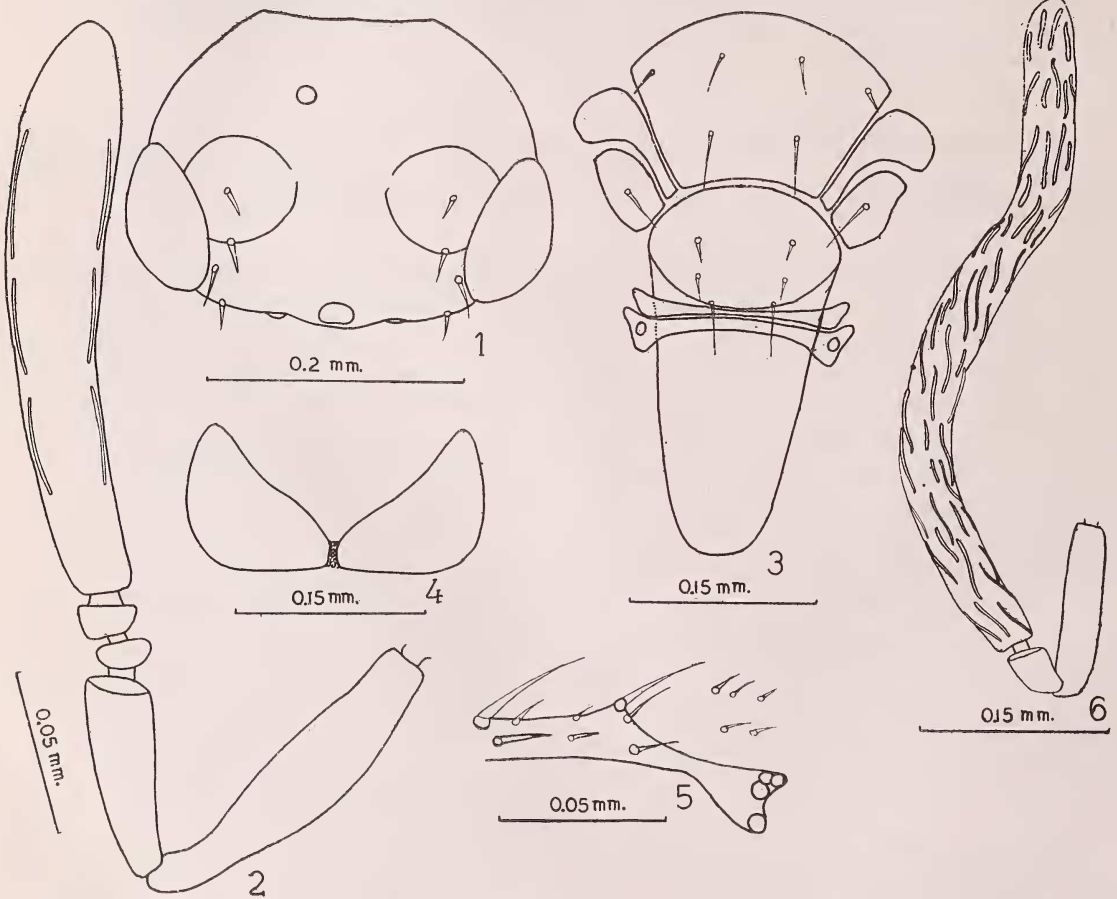
Eretmocerus hydrabadensis sp. nov.
 (Figs. 1-6)

FEMALE

Head (Fig. 1)—Light brown, wider than long in facial view (O.31: O.23); vertex

sparsely setose, frons with few setae; eyes dark; malar space more than the longitudinal diameter of eyes (O.14: O.12); ocelli in obtuse angled triangle, basal ocellus removed from occipital margin by about its own diameter (0.02) and from eye rim by slightly more than its own diameter; maxillary palpi two segmented, labial palpi unsegmented; mandibles tridentate.

Antennae (Fig. 2)—Whitish; scape about four times as long as wide (0.1:0.025); pedi-



Figs. 1-6. *Eretmocerus hydrabadensis* sp. nov.

1. Head (facial view); 2. Antenna ♀; 3. Thorax; 4. Pronotum; 5. Part of forewing venation; 6. Antenna ♂.

cel three and a half times as long as wide (0.07:0.02); first funicle segment ring like, second one and a half times wider than long; club about six times (0.17:0.03) as long as wide with three pairs of sensoria on margins.

Thorax (Fig. 3)—Light brown, pronotum orange yellow with two (Fig. 4) lobes joined in the middle by a membrane; axillae somewhat triangular with a single seta; parapsides hammer shaped, broad at apex, narrow at base; scutum and scutellum with 6 setae each; metanotum a transverse strip; meso-postphragma long, reaching upto middle length of abdomen, rounded at apex.

Forewings—Hyaline, less than three times as long as wide, (0.65:0.25), marginal vein shorter than submarginal, about one and a half times as long as stigmal (0.08:0.05) (Fig. 5), postmarginal absent; speculum mesally bounded by twenty setae arranged in two complete and a third incomplete row; marginal fringe short.

Hind wings—Hyaline, long, narrow, about ten times longer than wide; marginal fringe long, longer than wing disc.

Legs—Coxae and femora orange yellow except at apex and base, apex and base of femora, tibiae and tarsi whitish.

Gaster—Dark brown, longer than thorax; ovipositor slightly exerted arising from base of gaster; subgenital plate broad anteriorly with anterior margin straight, posterior margin narrow with a notch in the middle; first valvifers somewhat triangular; second valvifers with outer margin thickened; third valvulae movably articulated with second valvifers; outer plates of ovipositor narrow at base, broad at apex with a ridge along dorsal margin.

Female length : 0.87 mm

MALE — resembles the female, except for the following differences:

Antennae (Fig. 6) three segmented; scape about four times longer than wide (0.15:0.04); pedicel slightly longer than wide (0.4:0.03); club unsegmented about twelve times as long as wide (0.51:0.043) with many sensoria.

Male length: 0.81 mm.

Material studied: Holotype ♀ and ♂ India, Andhra Pradesh, Hyderabad ex white-fly on *Nerium odorum*, 3.X.1977 (T. Husain). Paratypes 2 ♂♂. Data same as for holotype. Material deposited with Zoology Museum, Department of Zoology, AMU Aligarh.

Genus *Azotus* Howard

Azotus Howard, 1898: Proc. Ent. Soc. Wash. 4:138.

Type species; *Azotus marchali* Howard

Dimacrocerus Brethes, 1914: Nunguam Otiosus, Buenos Aires: 4

Type species: *Dimacrocerus platensis* Brethes

This genus can be easily distinguished from others by the: seven segmented antennae with varied colours, four segmented funicle and an unsegmented club. Zinna (1962), Agarwal (1964) and Jasnosh (1966) suggested some new characters of the pronotum, subgenital plate and components of the female genitalia which are quite helpful in the generic diagnosis and have proved stable.

A. delhiensis Lal, 1938 was the first record from India. Agarwal (1964) described two new species and Khan & Shafee (1976) added three new species (all based on females). A new species *A. aleuroides* is being described, based on Male.

Azotus aleuroides sp. nov.

(Figs. 7 & 8)

MALE

Head—Light brown, vertex orange yellow, eyes red, wider than long in facial view; ocelli in acute triangle, basal ocellus removed from eye rim by about its own diameter (0.02) and from occipital margin by three times its

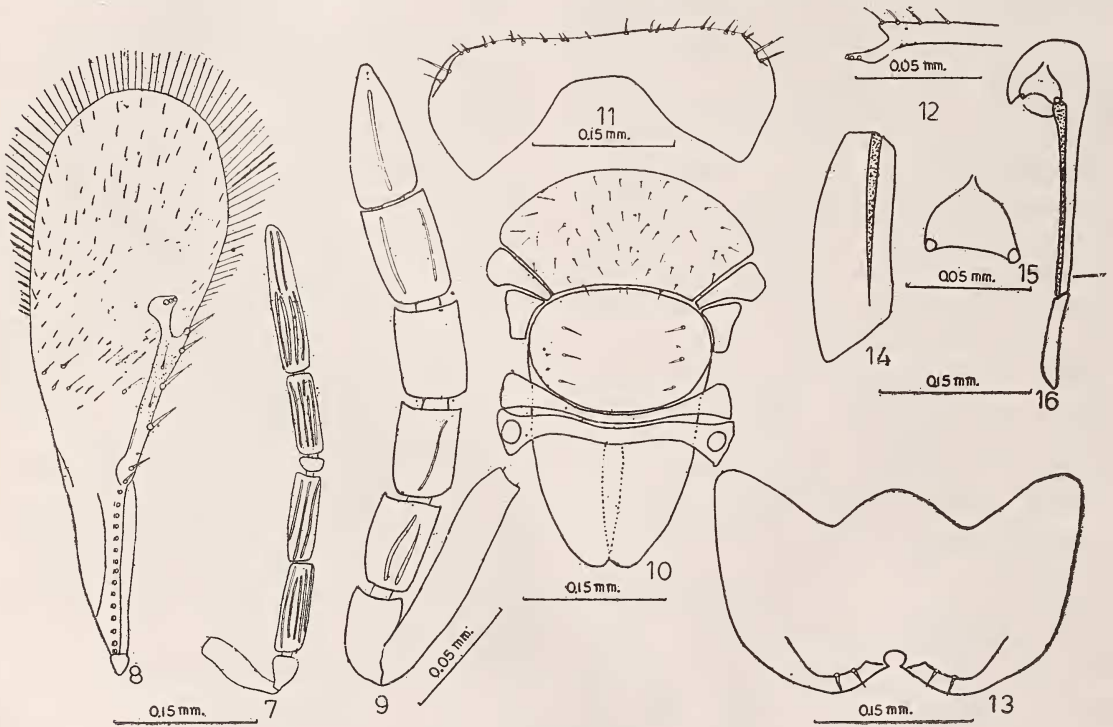
diameter; antennae inserted very close to oral margin; maxillary palpi two segmented; labial palpi unsegmented; mandibles tridentate.

Antennae (Fig. 7)—Light brown; scape about three times as long as wide (0.09:0.03); pedicel about one and a half times as long as wide (0.035:0.025), first, second and fourth funicle segments subequal, slightly more than three times as long as wide (0.09:0.029), third funicle ring like; club unsegmented, about six times as long as wide (0.16:0.027), as long as preceding two and half of second funicle segment combined; first funi-

cle to club except third, with 5, 3, 4 and 6 sensoria respectively.

Thorax—Scutellum and scutum dark brown, light brown on remaining part; pronotum with anterior and posterior margins deeply concave, anterior margin with a wide notch in the middle; parapsides and axillae with one seta each; scutum and scutellum with a pair of setae each; mesopostphragma rounded at apex.

Fore wings (Fig. 8)—About three times as long as wide (0.6:0.2); without infuscated bands, disc with sparsely arranged dark setae, area below stigmal vein without setae; costal



Figs. 7-8. *Azotus aleuroides* sp. nov.

7. Antenna ♂; 8. Forewing.

Figs. 9-16. *Physcus oriensis* sp. nov.

9. Antenna ♀; 10. Thorax; 11. Pronotum; 12. Part of forewing venation; 13. Subgenital plate; 14. Outer plate of ovipositor; 15. First valvifer; 16. Second and third valvulae.

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cell broad; submarginal as long as marginal (0.15), submarginal vein with a single seta and 14 bullae on its posterior margin; marginal comparatively thick with five setae, postmarginal reduced, stigmal expanded at apex; marginal fringe about one-fourth wing width.

Hind wings—Hyaline, more than six times longer than wide; marginal fringe long, longer than wing width.

Legs—Light brown except at apex and base of tibiae and tarsi whitish.

Gaster—Dark brown.

Male length: 0.89 mm.

Material studied—Holotype ♂, India, Uttar Pradesh, Aligarh. ex. white-fly on *Citrus medica*, 10.IX.1977 (T. Husain). Zool. Mus-AMU.

Comments—*A. aleuroides* sp. nov. is very close to *A. delhiensis* Lal, but differs from it, in the absence of infuscated bands on the fore wings and in the presence of a reduced postmarginal vein.

Genus *Physcus* Howard

Physcus Howard, 1895: U. S. Deptt. Agric. Bur. Ent. Tech. Ser. Bull. 1:43

Type species: *Coccophagus varicornis* Howard

This genus can be distinguished from allied genera by the: 7-segmented antennae of varied colour with all the three funicle segments subequal and a two segmented club. Additional characters suggested by Hayat (1971), "Outer plates of ovipositor narrow at base, gradually widening posteriorly with a submarginal ridge and obliquely truncated at apex; posterior margin of sebgenital plate with a notch in the middle, knobs on either side of the notch followed by laterally directed ridges", are stable and useful in generic diagnosis. We are in agreement that the shape of the pronotum—having expanded lateral lobes joined by a narrow bridge in the middle, can also

be tested at the generic level.

Five species have so far been described from India namely *P. albipodus* Agarwal, *P. flaviceps* Girault *et al.*; *P. reticulatus* Compere *et al.*; *P. compere* Hyat, *P. gunturiensis* Shafee. A new species *P. oriensis* is added and a key to Indian species of the genus based on females proposed.

KEY TO INDIAN SPECIES OF THE GENUS *Physcus* HOW. BASED ON FEMALES

1. Body predominantly black or brown.....2
— Body yellow, funicle I and II dark brown....
.....*P. flaviceps* Girault & Dodd
2. Club distinctly shorter than funicle.....3
— Club as long as funicle; scape four times as long as wide; pedicel as long as first funicle; funicle II and III pale yellow; abdomen brown.....*P. reticulatus* Compere & Annecke
3. Club brown4
— Club yellow6
4. Second funicle orange yellow.....5
— Second funicle light brown, scape four times as long as wide; submarginal vein with 16 setae and 12 bullae; postmarginal vein absent.....
.....*P. albipodus* Agarwal
5. Postmarginal vein absent; abdomen pale yellow, sides of dorsum and ventre with brown spots reaching upto cercal plates....*P. compere* Hayat
— Postmarginal vein slightly developed; abdomen brown without spots..*P. gunturiensis* Shafee *et al.*
6. Scape brown except apex, one and two funicle pale yellow; gaster white with a longitudinal brown band on either side..*P. aligarhensis* Hayat
— Scape light yellow, first funicle dark, second white; gaster rusty and without bands.....
.....*P. oriensis* sp. nov.

***Physcus oriensis* sp. nov.**

FEMALE

Head—Rust coloured, wider than long in facial view (0.35 : 0.22); sparse setae on vertex and frons; occipital margin rounded; fronto-vertex longer than wide (0.30 : 0.25); eyes dark; ocelli in obtuse triangle, basal ocellus removed from eye rim and from occipital margin by about its own diameter (0.15);

antennal sockets just above the ventral margins of eyes; malar space less than eye length (0.12 : 0.15); maxillary palpi two segmented, labial palpi unsegmented; mandibles tridentate.

Antennae (Fig. 9) — Scape and pedicel light yellow, first funicle dark, second white, remaining orange yellow; scape about five and a half times as long as wide (0.10 : 0.019); pedicel less than twice as long as wide (0.035 : 0.02); club two segmented, less than four times as long as wide (0.1 : 0.028), as long as preceding two and half of first funicle segment combined.

Thorax (Fig. 10) — Rust coloured; pronotum (Fig. 11) having expanded lateral lobes joined by a narrow bridge in the middle, anterior margin deeply notched in the middle, posterior margin with a row of sixteen submarginal setae; scutum as long as but wider than scutellum, with sparse setae; scutellum with three pairs of setae; parapside narrow at base, broad at apex; axillae somewhat triangular; mesopostphragma long and notched at apex.

Forewings — Hyaline, about three times as long as wide (0.68 : 0.22), disc profusely ciliated; costal cell broad; submarginal and marginal veins subequal (0.22), stigmal five times longer than short postmarginal (Fig. 12); marginal fringe short.

Hind wings — Hyaline, about five times longer than wide; marginal fringes long, more than half width of wing disc.

Legs — Uniform whitish yellow; midtibial spur shorter than basitarsus.

Gaster — Rust coloured, dorsum flat, ventre boat shaped; ovipositor slightly exerted; subgenital plate (Fig. 13) of almost uniform width, posterior margin with a notch flanked by knobs followed by laterally directed ridges with straight anterior margin; outer plates of

ovipositor (Fig. 14) narrow and truncated at apex, submarginal ridge prominent; first valvifers (Fig. 15) somewhat triangular, apical and basal angles at the same level; second valvifers long with thickened dorsal margin; third valvulae lanceolate and in a 1:3 ratio with second valvifers (Fig. 16) movably articulated. Female length: 0.95 mm.

Material studied: Holotype ♀, India, Uttar Pradesh, Bijnor, ex. *Coccus hesperidum* on *Citrus* sp., 3.5.1876 (T. Husain). Paratypes 15 ♀♀ data same as for holotypes. with Zool. Mus. A.M.U.

Genus *Prospaltella* Ashmead

Prospalta Howard, 1894: Insect life, 7:6 (Preoccupied by *Prospalta* Walker, 1875)

Type species: (*Prospalta murtfeldtii* Howard) = *Prospaltella murtfeldtii* (Howard)

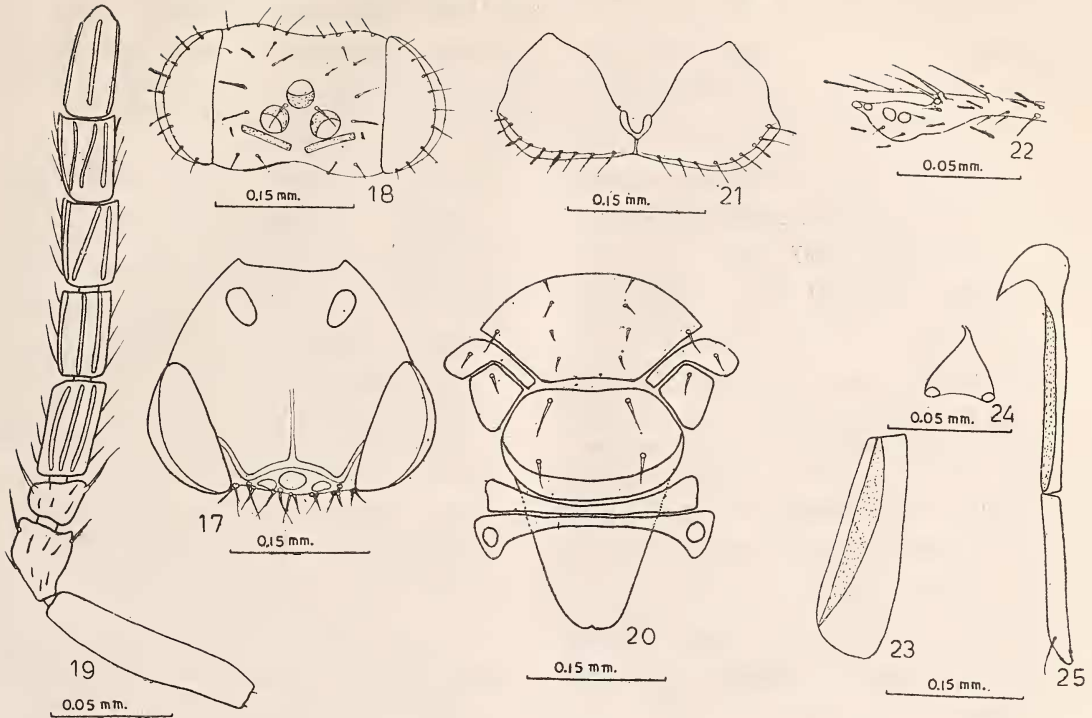
Prospaltella Ashmead, 1904: Proc. ent. Soc. Wash. 6:126

Minatomus Cockerell, 1911: Ent. News, 22: 464

Type *Minatomus peltalus* Coq.

This genus can be distinguished by the characters given by Ferriere (1965). From *Encarsia* Forster, to which it is closely related, it can be separated on the characters suggested by Agarwal (1964) namely, subgenital plate with anterior margin straight, posterior margin convex, gradually narrowing posteriorly without a median notch; outer plates of ovipositor narrow at base, broad and truncated at apex with a very narrow inflexion along dorsal margin extending upto three-fourth length of the plate.

Prospaltella clypealis Silvestri was recorded for the first time from India by Smith in 1950. Later Flanders (1969) and Shafee (1973) also recorded it. This species is redescribed to incorporate greater details .



Figs. 17-25. *Prospaltella clypealis* Silvestri.

17. Head (facial view); 18. Head (dorsal view); 19. Antenna ♀; 20. Thorax; 21. Pronotum; 22. Part of forewing venation; 23. Outer plate of ovipositor; 24. First valvifer; 25. Second and third valvulae.

***Prospaltella clypealis* Silvestri**
(Figs. 17-25)

FEMALE

Head (Figs. 17 & 18) — Chestnut coloured with sparsely arranged setae on vertex, wider than long in facial view (0.3 : 0.23); height of malar space equal to the major axis of eyes (0.14); eyes dark, sparsely setose; vertex with two oblique dark bands just behind basal ocelli; ocelli in acute triangle, basal ocellus removed from eye rim and occipital margin by about one and a half times its diameter; mixillary palpi two segmented, labial palpi unsegmented; mandibles tridentate.

Antennae (Fig. 19) — Orange yellow; space

four and a half times longer than wide (0.22 : 0.05), as long as pedicel to second funicle segment combined; pedicel slightly longer than wide (0.07 : 0.05), first funicle almost quadrate (0.05), second funicle to last club segments subequal, less than twice as long as wide (0.09 : 0.06); second funicle to club with 3, 3, 3, 4 and 3 sensoria respectively.

Thorax (Fig. 20) — Orange yellow, parapsides and metanotum slightly dark; pronotum (Fig. 21) with straight posterior margin with 18 setae, anterior margin notched in middle, notch flanked by ridges; scutum with 1+4+4+1 setae, scutellum with 2+2 setae; parapsides with a single seta each and axillae somewhat

rectangular with only one seta; mesopost-phragma with a notch at apex.

Fore wings—Hyaline less than three times as long as wide (0.65 : 0.25); costal cell narrow; speculum bounded by two rows of setae; submarginal, marginal and stigmal in a ratio: 3 : 2.3 : 1 respectively; postmarginal absent; submarginal with two and marginal with nine setae; marginal fringe very short.

Hind wings—Hyaline, about seven times as long as wide, marginal fringe long, longer than wing width.

Legs—Coxae and femora except apex light brown; apex of femora, tibiae and tarsi light yellow; mid tibial spur shorter than basitarsus.

Gaster—Chestnut coloured; subgenital plate with anterior margin straight, posterior margin convex, gradually narrowing posteriorly, without a median notch; outer plates of ovipositor (fig. 23) narrow at base, broad and truncated at apex with a very narrow inflexion along dorsal margin extending upto three-fourth length of the plate; first valvifers (Fig.

24) triangular with basal and apical angles at the same level; second valvifers long with thickened dorsal margin, third valvulae very long, and about half the length of second valvifers, movably articulated. (Fig. 25).

Female Length: 0.91 mm.

Material studied— 3 ♀♀ India, Uttar Pradesh, Aligarh, ex. *Aleyrodes* sp. on *Caesalpinia pulcherrima* L. 15.3.1977 (T. Husain) with Zool. Mus. A.M.U.

Comments—In all 10 species have so far been recorded from India—*P. breviclavata* Shafee; *P. flava* Shafee; *P. indica* Shafee; *P. opulenta* Silvestri; *P. clypealis* Silvestri; *P. citri* Agarwal; *P. smithi* Silvestri; *P. divergens* Silvestri; *P. pseudococci* Agarwal and *P. udaipuriensis* Shafee. Shafee (1973) has presented a very good key to the identification of Indian species.

ACKNOWLEDGEMENTS

We are grateful to the Head, Department of Zoology for providing necessary facilities.

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